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EXAMINER	
BELANI, KISHIN G	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/691,116	JASON ET AL.	
	Examiner	Art Unit	
	Kishin G. Belani	2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20 and 23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20 and 23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/ are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This action is in response to Applicant's amendment filed on 09/10/2007. **Independent claims 1 and 11** have been amended to correct minor informalities. **Claims 21 and 22** have been cancelled. New **Independent claim 23** has been added. No other claims have been amended. **Claims 1-20 and 23** are now pending in the present application. The applicants' amendments are shown in ***bold and italics***, and the examiner's response to the amendments is shown in **bold** in this office action. **This Action is made FINAL.**

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 11-13 are rejected under 35 U.S.C. 102(e) as being anticipated by **Kling et al. (U.S. Patent Publication # 6,662,203 B1).**

Consider **claim 1**, Kling et al. show and disclose a method comprising:

examining a set of services to identify two or more parallel services performed by a common processor (Fig. 3, Job Scheduler 30 with job buffers 35A-D for holding asynchronous jobs (services) for later transfer to the processing core 40 with parallel processing execution pipelines 45A-D; column 5, lines 39-43 and column 6, lines 15-19 that disclose the same details);

processing a defined number of data elements to simulate a data flow through the set of services (Fig 3, Job Queue (JQ) 42 that represents a stack of synchronous and asynchronous jobs being processed, thereby simulating a data flow through the set of services; column 6, lines 20-23 that disclose the same details);

determining an element ratio that defines the portion of data elements processed by each of the parallel services (Fig. 2A that graphically represents a proportion of time units when the lower priority synchronous jobs may execute (represented by the underlined time scale along x-axis) versus when the higher priority asynchronous jobs may execute (represented by the non-shaded area of the graph) in the absence of a delay queue DLAYQ 20; Fig 2B that discloses the same details when a delay queue is employed, thus disclosing means for determining an element ratio between the synchronous versus asynchronous jobs; column 4, lines 53-67 and column 5, lines 1-21 that disclose the same details); and

defining a scheduling service that distributes the data elements to each parallel service (Fig. 3, Job Scheduler 30 and Job Queue (JQ) 42 that provide a scheduling service to distribute the queued jobs to the parallel processing execution pipelines 45A-D; column 5, lines 39-43 and column 6, lines 15-19 that disclose the same details).

Consider **claim 2**, and **as it applies to claim 1 above**, Kling et al. show and disclose a method comprising modifying the set of services to route the data elements based on the element ratio (Fig. 2A that graphically represents a proportion of time units when the lower priority synchronous jobs may execute (represented by the underlined time scale along x-axis) versus when the higher priority asynchronous jobs may execute (represented by the non-shaded area of the graph) in the absence of a delay queue DLAYQ 20; Fig 2B that discloses employing a modification by introducing a delay queue to route the data elements based on the element ratio, thereby improving the performance; column 4, lines 53-67 and column 5, lines 1-29 that disclose the same details).

Consider **claim 3**, and **as it applies to claim 2 above**, Kling et al. disclose a method wherein the common processor is a packet engine (column 5, lines 61-63 that disclose the signal processing unit of the AXE Digital Switching System from Telefonaktiebolaget LM Ericsson with the same performing capabilities).

Consider **claim 11**, Kling et al. disclose a processing system which, when executed by the processor, cause that processor to:
examine a set of services to identify two or more parallel services performed by a common processor (Claim 1; Fig. 3, Job Scheduler 30 with job buffers 35A-D for holding asynchronous jobs (services) for later transfer to the processing core 40 with parallel

processing execution pipelines 45A-D; column 5, lines 39-43 and column 6, lines 15-19 that disclose the same details);

process a defined number of data elements to simulate a data flow through the set of services (Fig 3, Job Queue (JQ) 42 that represents a stack of synchronous and asynchronous jobs being processed, thereby simulating a data flow through the set of services; column 6, lines 20-23 that disclose the same details); and

determine an element ratio that defines the portion of data elements processed by each of the parallel services (Fig. 2A that graphically represents a proportion of time units when the lower priority synchronous jobs may execute (represented by the underlined time scale along x-axis) versus when the higher priority asynchronous jobs may execute (represented by the non-shaded area of the graph) in the absence of a delay queue DLAYQ 20; Fig 2B that discloses the same details when a delay queue is employed, thus disclosing means for determining an element ratio between the synchronous versus asynchronous jobs; column 4, lines 53-67 and column 5, lines 1-21 that disclose the same details); and

define a scheduling service that distributes the data elements to each parallel service (Fig. 3, Job Scheduler 30 and Job Queue (JQ) 42 that provide a scheduling service to distribute the queued jobs to the parallel processing execution pipelines 45A-D; column 5, lines 39-43 and column 6, lines 15-19 that disclose the same details).

Consider **claim 12**, and **as it applies to claim 11 above**, Kling et al. disclose a processing system for modifying the set of services to route the data elements based on

the element ratio (Fig. 2A that graphically represents a proportion of time units when the lower priority synchronous jobs may execute (represented by the underlined time scale along x-axis) versus when the higher priority asynchronous jobs may execute (represented by the non-shaded area of the graph) in the absence of a delay queue DLAYQ 20; Fig 2B that discloses employing a modification by introducing a delay queue to route the data elements based on the element ratio, thereby improving the performance; column 4, lines 53-67 and column 5, lines 1-29 that disclose the same details).

Consider **claim 13**, and **as it applies to claim 12 above**, Kling et al. disclose a Processing system wherein the processor is a packet engine (column 5, lines 61-63 that disclose the signal processing unit of the AXE Digital Switching System from Telefonaktiebolaget LM Ericsson with the same performing capabilities).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness
or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4, 9, 10, 14, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kling et al. (U.S. Patent Publication # 6,662,203 B1)** in view of **Thompson et al. (U.S. Patent Publication # 7,114,158 B1).**

Consider **claim 4** and **as it applies to claim 1 above,** Kling et al. discloses the method of the claimed invention, except determining an average processing time for each of the parallel services, the average processing time representing the average time that a parallel service requires to process a single data element.

In the same field of endeavor, Thompson et al. disclose a method to determine an average processing time for each of the parallel services, the average processing time representing the average time that a parallel service requires to process a single data element (column 7, lines 53-57 that disclose average processing time for a single request in a system in which processing occurs in stages in which the application services execute batches of requests in parallel (Fig. 5; column 3, lines 63-65)).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to determine an average processing time for each of the parallel services, the average processing time representing the average time that a parallel service requires to process a single data element, as taught by Thompson et al., in the method of Kling et al., so that the overall processing time for a batch of requests can be calculated.

Consider **claim 9**, and **as it applies to claim 1 above,** Kling et al. discloses the method of the claimed invention, except wherein the set of services is represented by a data flow graph.

In the same field of endeavor, Thompson et al. disclose a method wherein the set of services is represented by a data flow graph (Fig. 5; column 9, lines 11-67 and column 10, lines 1-32 that describe the data flow graph details shown in Fig. 5).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to represent the set of services by a data flow graph,

as taught by Thompson et al., in the method of Kling et al., so that the processing sequence of a work packet can be clearly represented.

Consider **claim 10**, and **as it applies to claim 1 above,** Kling et al. disclose the method of the claimed invention, except wherein each data element is a data packet.

In the same field of endeavor, Thompson et al. disclose a method wherein each data element is a data packet (Fig. 5; column 9, lines 13-18 that disclose generating work packets 232 (shown in Fig. 6)).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to represent each data element as a data packet, as taught by Thompson et al., in the method of Kling et al., so that a long message or file can be transmitted and processed as a batch of smaller, more manageable data packets.

Consider **claim 14** and **as it applies to claim 11 above,** Kling et al. disclose the claimed processing system except for determining an average processing time for each of the parallel services, wherein the average processing time represents the average time that a parallel service requires to process a single data element.

In the same field of endeavor, Thompson et al. disclose a computer program product comprising instructions for determining an average processing time for each of the parallel services, wherein the average processing time represents the average time that a parallel service requires to process a single data element (claim 18; column 7,

lines 53-57 that disclose average processing time for a single request in a system in which processing occurs in stages in which the application services execute batches of requests in parallel (Fig. 5; column 3, lines 63-65)).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide computer program instructions for determining an average processing time for each of the parallel services, wherein the average processing time represents the average time that a parallel service requires to process a single data element, as taught by Thompson et al., in the processing system of Kling et al., so that the overall processing time for a batch of requests can be calculated.

Consider **claim 19**, and **as it applies to claim 11 above,** Kling et al. disclose the processing system of the claimed invention, except wherein the set of services is represented by a data flow graph.

In the same field of endeavor, Thompson et al. disclose a computer program product, wherein the set of services is represented by a data flow graph (Claim 18; Fig. 5; column 9, lines 11-67 and column 10, lines 1-32 that describe the data flow graph details shown in Fig. 5).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a set of computer instructions that process a set of services represented by a data flow graph, as taught by Thompson et al., in the

processing system of Kling et al., so that the processing sequence of a work packet can be clearly represented.

Consider **claim 20**, and **as it applies to claim 11 above,** Kling et al. disclose the claimed processing system except wherein each data element is a data packet.

In the same field of endeavor, Thompson et al. disclose a set of computer instructions that process each data element, wherein each data element is a data packet (Claim 18; Fig. 5; column 9, lines 13-18 that disclose generating work packets 232 (shown in Fig. 6)).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a set of computer instructions that process each data element as a data packet, as taught by Thompson et al., in the processing system of Kling et al., so that a long message or file can be transmitted and processed as a batch of smaller, more manageable data packets.

Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kling et al. (U.S. Patent Publication # 6,662,203 B1)** in view of **Thompson et al. (U.S. Patent Publication # 7,114,158 B1),** and further in view of **Ferguson et al. (U.S. Patent Publication # 7,215,637 B1).**

Consider **claim 5**, and **as it applies to claim 4 above,** Kling et al., as modified by Thompson et al., disclose the method of the claimed invention, except determining a

time-ratio product for each of the parallel services, the time-ratio product being based on the mathematical product of the average processing time and the element ratio.

In the same field of endeavor, Ferguson et al. disclose a method of determining a time-ratio product for each of the parallel services, the time-ratio product being based on the mathematical product of the average processing time and the element ratio (column 45, lines 59-65 that describe four Per Bank Notification Queues 1700, wherein the four queues are serviced in the ratio: Q1 at 50%, Q2 at 25%, Q3 at 15%, and Q4 at 10%, thereby disclosing an element ratio of 5:2.5:1.5:1 or 10:5:3:2, i.e. for 10 data elements processed from Q1, 5 data elements will be processed from Q2, 3 data elements will be processed from Q3 and 2 data elements will be processed from Q4; column 46, lines 17-18 which disclose that memory allocation for the stream is proportional to the stream's bandwidth, which for each queue type will be proportional to the average processing time for a data element multiplied by the number of data elements processed in a unit time multiplied by the element ratio of each queue).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to determine a time-ratio product for each of the parallel services, the time-ratio product being based on the mathematical product of the average processing time and the element ratio, as taught by Ferguson et al., in the method of Kling et al., as modified by Thompson et al., so proper load balancing of parallel services can be arranged.

Consider **claim 15**, and **as it applies to claim 14 above,** Kling et al., as modified by Thompson et al., disclose the computer program product comprising instructions for the claimed invention, except determining a time-ratio product for each of the parallel services, wherein the time-ratio product is based on the mathematical product of the average processing time and the element ratio.

In the same field of endeavor, Ferguson et al. disclose a system of determining a time-ratio product for each of the parallel services, the time-ratio product being based on the mathematical product of the average processing time and the element ratio (claim 7; column 45, lines 59-65 that describe four Per Bank Notification Queues 1700, wherein the four queues are serviced in the ratio: Q1 at 50%, Q2 at 25%, Q3 at 15%, and Q4 at 10%, thereby disclosing an element ratio of 5:2.5:1.5:1 or 10:5:3:2, i.e. for 10 data elements processed from Q1, 5 data elements will be processed from Q2, 3 data elements will be processed from Q3 and 2 data elements will be processed from Q4; column 46, lines 17-18 which disclose that memory allocation for the stream is proportional to the stream's bandwidth, which for each queue type will be proportional to the average processing time for a data element multiplied by the number of data elements processed in a unit time multiplied by the element ratio of each queue).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to determine a time-ratio product for each of the parallel services, the time-ratio product being based on the mathematical product of the average processing time and the element ratio, as taught by Ferguson et al., in the

system of Kling et al., as modified by Thompson et al., so proper load balancing of parallel services can be arranged.

Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kling et al. (U.S. Patent Publication # 6,662,203 B1)** in view of **Thompson et al. (U.S. Patent Publication # 7,114,158 B1)** and further in view of **Ferguson et al. (U.S. Patent Publication # 7,215,637 B1)** and further in view of **Bigus (U.S. Patent Publication # 5,442,730).**

Consider **claim 6**, and **as it applies to claim 5 above,** Kling et al., as modified by Thompson et al. and Ferguson et al., disclose a method of the claimed invention, except comparing the time-ratio products of each parallel process to determine a normalized ratio.

In the same field of endeavor, Bigus discloses a method of comparing the time-ratio products of each parallel process to determine a normalized ratio (Fig. 9 that shows plots of three simulation runs, each for four different classes of jobs (Terminal, Batch, Transaction, and Distributed), with the vertical axis representing processing time for each job; and the table in Fig. 8 that shows the normalized values of the processing time for the corresponding classes, with the "Terminal" value normalized to 1.0 in Example 1 "Desired" column; and other classes with values corresponding to the normalized value of 1.0 for the Desired Terminal value; column 9, lines 58-68 and column 10, lines 9-19 that disclose the same details).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to compare the time-ratio products of each parallel process to determine a normalized ratio, as taught by Bigus in the method of Kling et al., as modified by Thompson et al. and Ferguson et al., so that an easy comparison may be made for the relative processing time needed for each class of job or process.

Consider **claim 16**, and **as it applies to claim 15 above,** Kling et al., as modified by Thompson et al. and Ferguson et al., disclose the claimed invention, except disclosing a computer program product further comprising instructions for comparing the time-ratio products of each parallel process to determine a normalized ratio.

In the same field of endeavor, Bigus discloses a computer program product further comprising instructions for comparing the time-ratio products of each parallel process to determine a normalized ratio (Claims 12-14; Fig. 9 that shows plots of three simulation runs, each for four different classes of jobs (Terminal, Batch, Transaction, and Distributed), with the vertical axis representing processing time for each job; and the table in Fig. 8 that shows the normalized values of the processing time for the corresponding classes, with the "Terminal" value normalized to 1.0 in Example 1 "Desired" column; and other classes with values corresponding to the normalized value of 1.0 for the Desired Terminal value; column 9, lines 58-68 and column 10, lines 9-19 that disclose the same details).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a computer program product further

comprising instructions for comparing the time-ratio products of each parallel process to determine a normalized ratio, as taught by Bigus in the computer program product of Kling et al., as modified by Thompson et al. and Ferguson et al., so that an easy comparison may be made for the relative processing time needed for each class of job or process.

Claims 7, 8, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kling et al. (U.S. Patent Publication # 6,662,203 B1)** in view of **Thompson et al. (U.S. Patent Publication # 7,114,158 B1)** and further in view of **Ferguson et al. (U.S. Patent Publication # 7,215,637 B1)** and further in view of **Bigus (U.S. Patent Publication # 5,442,730),** and further in view of **Su et al. (U.S. Patent Publication # 6,625,161 B1).**

Consider **claim 7**, and **as it applies to claim 6 above,** Kling et al., as modified by Thompson et al., Ferguson et al. and Bigus, disclose a method of the claimed invention, except modifying the set of services to route the data elements based on the normalized ratio.

In the same field of endeavor, Su et al. disclose a method of modifying the set of services to route the data elements based on the normalized ratio (Fig. 4 that shows an adaptive network device 17 with four operational units to modify the set of services to route the data elements based on the normalized ratio; column 5, lines 39-67 and columns 6-7 that describe the operational details of modifying the services; flowchart of

Fig. 3, blocks 33, 35, and 31; column 4, lines 49-67 and column 5, lines 1-38 also show and disclose the same details).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify a set of services to route the data elements based on the normalized ratio, as taught by Su et al., in the method of Kling et al., as modified by Thompson et al., Ferguson et al. and Bigus, so that the network load can be properly balanced and packet congestion avoided.

Consider **claim 8**, and **as it applies to claim 7 above,** Kling et al., as modified by Thompson et al., Ferguson et al. and Bigus, disclose a method of the claimed invention, except defining a scheduling service that distributes the data elements to each parallel service.

In the same field of endeavor, Su et al. disclose a method of defining a scheduling service that distributes the data elements to each parallel service (Fig. 4 that shows an adaptive network device 17 with four operational units that provide a scheduling service that distributes the data elements to each parallel service 139A-D; column 5, lines 39-67 and columns 6-7 that describe the operational details of the scheduling service).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide an scheduling service that distributes the data elements to each parallel service, as taught by Su et al., in the method of Kling et

al., as modified by Thompson et al., Ferguson et al. and Bigus, so that the network load can be properly balanced and packet congestion avoided.

Consider **claim 17**, and **as it applies to claim 16 above,** Kling et al., as modified by Thompson et al., Ferguson et al. and Bigus, disclose the claimed invention, except disclosing a computer program product further comprising modifying the set of services to route the data elements based on the normalized ratio.

In the same field of endeavor, Su et al. disclose a computer program product further comprising instructions for modifying the set of services to route the data elements based on the normalized ratio (Claims 17-34; Fig. 4 that shows an adaptive network device 17 with four operational units to modify the set of services to route the data elements based on the normalized ratio; column 5, lines 39-67 and columns 6-7 that describe the operational details of modifying the services; flowchart of Fig. 3, blocks 33, 35, and 31; column 4, lines 49-67 and column 5, lines 1-38 also show and disclose the same details).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a computer program product with instructions for modifying the set of services to route the data elements based on the normalized ratio, as taught by Su et al., in the computer program product of Kling et al., as modified by Thompson et al., Ferguson et al. and Bigus, so that the network load can be properly balanced and packet congestion avoided.

Consider **claim 18**, and **as it applies to claim 17 above,** Kling et al., as modified by Thompson et al., Ferguson et al. and Bigus, disclose the claimed invention, except disclosing a computer program product with instructions for defining a scheduling service that distributes the data elements to each parallel service.

In the same field of endeavor, Su et al. disclose a computer program product further comprising instructions for defining a scheduling service that distributes the data elements to each parallel service (Claims 17-34; Fig. 4 that shows an adaptive network device 17 with four operational units that provide a scheduling service that distributes the data elements to each parallel service 139A-D; column 5, lines 39-67 and columns 6-7 that describe the operational details of the scheduling service).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a computer program product with instructions for defining a scheduling service that distributes the data elements to each parallel service, as taught by Su et al., in the computer program product of Kling et al., as modified by Thompson et al., Ferguson et al. and Bigus, so that the network load can be properly balanced and packet congestion avoided.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Cheng et al. (US Patent Application Publication # 2007/0291755 A1) in view of Kling et al. (U.S. Patent Publication # 6,662,203 B1).**

Consider **claim 23**. **Cheng et al. disclose *a system comprising*:**

a plurality of packet engines configured to process data packets **(Fig. 1 that shows a plurality of Packet Engines 116 (PE) along with one or more Virtual Service Engines 106 (VSE); Fig. 6 that specifically shows a plurality of packet engines 616 both at the packet ingress and egress ends; paragraph 0007 that discloses the pre-processing of a multicast packet at the ingress end to create flow classification indices for the multicast packet and post-processing of the packet at the egress end to transform the multicast packet in accordance with the identified transform control instructions and outputting the transformed multicast message; paragraph 0026 further discloses that the system may provide hardware-based network processor for parallel-processing and pipelining, thus disclosing that the plurality of packet engines are configured to process data packets);**

an examination module configured to examine a set of services to identify two or more parallel services performed by one of the plurality of packet engines **(Fig. 1 that shows PE 116 acting as a packet pre-processor (an examination module); Fig. 4; paragraph 0007 which discloses the packet examination function performed at the ingress end by the packet engine PE 116, then identifying services performed by a plurality of packet engines VSEs 106 at the egress end; paragraph 0028, lines 11-22 which disclose that VSEs 106 and ASEs 108 (Advanced Security Engines) may perform parallel processing and other high-end computing services as well);**

means for determining a portion of the data packets processed by each of the parallel services **(flowcharts shown in Figs. 4 and 5 that show a multicast (broadcast) packet flow through both the ingress system and egress system; wherein the ingress system classifies packet flow and retrieves flow index in order to send the packet payload with the flow index to one of the Virtual Service Engines 106 with parallel processing capability; then repeating for the rest of the flow indices in the broadcast packet and forwarding to a plurality of VSEs and ASEs at the egress end, thereby disclosing means for determining a portion of the data packets processed by each of the parallel services); and**

a schedule generation module configured to distribute the data packets to each parallel service based on the determined portion of the data packets **(steps 410, 412, 416, 418-422 in the flowchart shown in Fig. 4 that show a multicast (broadcast) packet flow through the ingress system; wherein after the ingress system classifies packet flow and retrieves flow index, it sends the packet payload with the flow index to one of the Virtual Service Engines 106 and/or Advanced Security Engines 108 with parallel processing capability at the egress system; then repeating for the rest of the flow indices, thereby disclosing a schedule generation module (VRE 104) configured to distribute the data packets to each parallel service based on the determined portion of the data packets)**

However, Cheng et al. do not specifically disclose ***a simulation module configured to simulate a data flow through the set of services***.

In the same field of endeavor, Kling et al. disclose the claimed system, including

***a simulation module configured to simulate a data flow through the set of services* (Fig 3, Job Queue (JQ) 42 that represents a stack of synchronous and asynchronous jobs being processed, thereby simulating a data flow through the set of services; column 6, lines 20-23 that disclose the same details).**

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a simulation module configured to simulate a data flow through the set of services, as taught by Kling et al., in the system of Cheng et al., so that a determination can be made to verify that the network load is properly balanced among available packet engines with parallel services processing capability.

Response to Arguments

Applicant's arguments filed 11/06/2007 have been fully considered but they are not persuasive.

The examiner respectfully disagrees with applicant's arguments as the applied reference(s) provide adequate support and clarification. The examiner's rejection of 08/07/2007 for **claims 1-20** is maintained.

Consider **claim 1,** the applicants have argued that Kling et al. do not disclose "determining an element ratio that defines a portion of data elements processed by each of the parallel services", because nowhere in the Kling et al. reference can they find any disclosure of **number of jobs at lower priority levels**. The examiner suggests looking at column 2; line 28 that include the text **execution of jobs of lower priority levels,** as well as at several other places in the cited reference. The applicants further argue that

the Kling reference does not determine any kind of ratio between the highest priority level jobs and lower priority level jobs. The examiner asserts that a ratio can be represented by many different ways, e.g. two line segments of different lengths, slope of a line on a graph, bar and pie charts or shaded vs. unshaded areas in a figure, in addition to showing actual division of two quantities. The cited reference in Figs. 2A and 2B has elected to represent a ratio in the form of figures with shaded, unshaded and underlined areas. Also, contrary to applicants assertion that the cited figures 2A and 2B of Kling et al. reference merely disclose the highest priority level jobs, the examiner suggests that the applicants look more carefully at the text along the "t" axis in Fig. 2A (EXECUTION AT LOWER PRIORITY LEVELS) and Fig. 2B (EXECUTION AT LOWER PRIORITY LEVELS). The purpose of underlining the text shown in parentheses was to point out the times when the low priority tasks are executing.

Furthermore, the examiner's assertion that the asynchronous jobs are assigned higher priority than the synchronous jobs is based on the scheduling problem in many multiprocessing systems discussed in the background section of the cited reference and how the cited invention is able to solve that problem. The cited reference discloses (in column 1, lines 23-34) that the available processing capacity may be directed towards jobs of high priority levels at first, and subsequently the capacity may be directed towards jobs of lower priority levels. However, jobs of higher priority levels normally interrupt execution of jobs of lower priority levels, leading to high number of priority level changes, and inefficient use of the execution capacity. To solve this problem, the inventors propose (in column 3, lines 50-67) delaying the execution of randomly

arriving, event-driven higher priority asynchronous jobs, so that the currently executing lower priority synchronous jobs are not interrupted with their execution suspended in order to process the incoming asynchronous jobs, thereby achieving a better load balance between the asynchronous and synchronous jobs. As a potential drawback, (in column 4, lines 24-25), the inventors disclose that the increased efficiency is however achieved at the price of increased latency for the asynchronous signals. If the asynchronous signals were not of higher priority, there would be no latency associated with their delayed execution.

The applicants' argument that the examiner has asserted that the asynchronous jobs correspond to the **highest** priority level jobs is false. The examiner has only stated that (based on the background scenario listed above) the event-driven asynchronous jobs have a **higher** priority than the synchronous jobs. There being a plurality of priorities (four shown in Fig. 3), the header of the asynchronous signal has still to be analyzed to place the job in appropriate priority queue. Furthermore, the applicants' assertion that the highest priority jobs of Kling would always be delayed and temporarily stored, whereas the lower priority jobs would get inserted directly into the job scheduler, is not quite correct. As explained earlier, the reason for delaying the higher priority asynchronous jobs is to give an opportunity to any currently executing lower priority synchronous jobs to continue to execute instead of being immediately pre-empted, thereby achieving a better load balance. Further, to clarify the applicants' comment that the examiner used the words "means of determining an element ratio ..." to explain a claim that is not in means plus function format, the examiner was attempting to explain

a way of presenting a ratio other than the division of two numbers. The examiner has thus responded to all the arguments presented for **claim 1**, and still upholds the rejection. Related independent **claim 11** and corresponding dependent **claims 2-3 and 12-13** also remain rejected.

Consider **claim 4.** The applicants agree that the cited portion of Thompson et al. discloses that the average amount of time increases for processing a single request; they argue that there is no disclosure of **determining an average processing time.** The examiner rejects this argument, because if the cited reference discloses that the average amount of time increases for processing a single request, it must first be capable of determining the average processing time before determining that the average processing time increases for a single request. Determining an average by taking the total time and dividing it by the number of data elements is a well known definition of an average value, and need not be elaborated. Therefore **claim 4** as well as other dependent **claims 5-10 and 14-20** still remains rejected, since these claims present no new arguments. **Claim 23** is a newly added claim; therefore, it requires no response.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any response to this Office Action should be **faxed to** (571) 273-8300 **or mailed to**:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Art Unit: 2143

Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Kishin G. Belani whose telephone number is (571) 270-1768. The Examiner can normally be reached on Monday-Thursday from 6:30 am to 5:00 pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-0800.

Kishin G. Belani
K.G.B./kgb

January 9, 2008